



**Japanese Published Unexamined (Kokai Koho) Patent Application (A) No. 06259211, published September 16, 1994; Application No. 05-67982, filed March 4, 1993; Int.Cl.: G06F 3/14; Inventor(s): Katsumi Akiyoshi; Assignee: Fuji Xerox Corporation; Japanese Title: Interactive Processing Systems (Taiwa Gata Shori System)**

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## **INTERACTIVE PROCESSING SYSTEMS**

### **CLAIM(S)**

**1) An interactive processing system, wherein multiple interface components for executing an interface function on the display screen of a display device are positioned in the operation screen panel of one window, characterized by its comprising: a page control means for controlling multiple pages of operation screen panel in which to position the interface components; a panel page control means for controlling to switch the pages of the operation screen panel.**

### **DETAILED DESCRIPTION OF THE INVENTION**

**(0001)**

**(Field of Industrial Application)**

**The present invention pertains to an interactive processing system, particularly to the one, wherein multiple interface components for executing a user interface function on the screen of a display device are positioned in the operation**

screen panel of one window.

(0002)

(Prior Art)

In recent user-end data processing systems that have an improved man-machine interface, such as that of workstation or personal computer, there is a graphic user interface creation support device for automatic creation of source codes and data files of a final program containing interface components, whereby a graphic user interface is created by using a pointing device of a mouse, so the user can position a button or menu by interaction, according to the user's preference when creating the graphic interface of an application program.

(0003)

In such an interactive processing system having multiple interface components for executing a user interface function on the display screen of a display device, the data contained in an operation panel (interface components) are converted into a source program, so the source program of the interface components is created when creating an operation panel on the display screen incorporated with interface components. By compiling this source program and linking it to the application program, the interface components of an executable user interface function is created. When the specifications of the interface components on the operation panel in the display screen need to be changed, the corresponding portions

of the source program, which is an initial program, are changed, compiled and linked to the application program.

(0004)

In constructing the prior art user interface for a data processing system of this type, it is necessary to create a program to operate a user interface that executes the interaction between the user and the system, so the prior art system suffers from the problem that even partial change of the specification requires a complex operation process.

(0005)

In “Synthesized Interactive Processing System” disclosed in Japanese Unexamined Published Application 02-266424, the system presents a component consisting of visual data for the data base and descriptive data for the operation, and by combining them, the operation program for a user interface function of a computer response system is synthesized, which makes it easy to construct a user interface. Accordingly, this synthesized interactive processing system comprises: a data base unit of an interface component presenting a component consisting of visual data and operation-describing data; an interface component editing unit for combining and describing the components of said interface component data base; an interface-synthesizing unit for synthesizing the interactive processing unit based on the description by said interface component editing unit. By a simple method of

combining the components by using them, the interactive processing unit for a computer response system is constructed.

(0006)

Moreover, “Software for Prototype Creation Support Device” disclosed in Japanese Unexamined Patent Application 02-254539 is an interface unit creation support device, whereby a prototype of a man-machine interface unit for an interactive CAD system is created by input of graphs. In this “Software for Prototype Creation Support Device,” the input graphs are each independently registered in the database as the constituent element (e.g., menu) of a man-machine interface for the interactive CAD system, and by operating them according to the designated operation description, the function of the prototype can be carried out. Then, it is output after being converted into the source code of a desired system.

(0007)

Moreover, in “Man-Machine Interface” disclosed in Japanese Unexamined Published Application 3-24621, an editing unit is required in the man-machine interface. The application proposes that the component units are preliminarily constructed, and each component unit is provided with parameters having a default unit. By so doing, the components that are being used by the editing unit can be properly mounted and dismounted.

(0008)

**(Problems of the Prior Art to Be Addressed)**

**When the operation panel containing the user interface component for the application program for the interactive system of this type is created on the display screen, the similar interface with its operation panel partially changed is most frequently used. But, in such a case, it is impossible to change the user interface component alone, so the corresponding portion of the source program in the initial program is changed, compiled and linked to the application program even when the specifications of the interface components are partially changed on the panel of the display screen, which is a tedious task.**

**(0009)**

**Therefore, various user interface creation support devices and systems like those mentioned above have been proposed, so that the users' tasks to program the source code for creating the graphic user interface components can be eliminated to improve the productivity. Accordingly, when a graphic user interface in an application program is created by using various interface creation support devices or systems, the basic creation method is to properly position the interface components, such as input/output area and button, by operation of a mouse.**

**(0010)**

**When the interface of an application program is created, many interface components need to be positioned. If each interface component has a large size, the**

**operation panel in which to position the interface components needs to be enlarged.**

**As a result, the operation panel of a graphic user interface becomes very large.**

**Therefore, when an application program is executed, the window on the graphic user interface operation screen occupies most part of the screen of a display device.**

**In the worst case, the entire operation panel, which functions as a display screen for the operation, cannot be displayed, which is a problem.**

**(0011)**

**When such a problem occurred to the prior art user interface creation support system, the problem was solved by a method, wherein less frequently used interface components were separated into a group of other interface components, and by pressing a button of one interface component on the operation screen, another window is opened to display a new operation panel, in order to display the group of separated interface components on the operation panel. By so doing, the main operation panel dimension is reduced, and another operation panel is displayed in the separate window, so multiple windows of the operation panel for one application program are scattered on the display screen of the display device.**

**(0012)**

**Multiple windows of the operation panel for one application program are displayed as each separate panel window, so it becomes necessary to provide a window control program to control each of the multiple windows. Accordingly, the**

**number of programs for the user interface function increases, requiring a large memory capacity to operate the application program. Also, in order to store said application program, or process the data, the load for handling them becomes very heavy, which is a problem.**

**(0013)**

**The present invention was produced to solve the aforementioned problems, and aims to present an interactive processing system, wherein multiple interface components for executing the interface function on the screen of the display device are positioned in the operation panel of one window, so multiple interface components can be positioned in the operation panel in the interactive processing system.**

**(0014)**

**(Means to Solve the Problems)**

**To achieve the aforementioned objective, in the interactive processing system of the present invention, multiple interface components for executing the user interface function on the screen of the display device are positioned in the operation panel of one window, and comprises page control means 10 for controlling the operation panel, in which to position the interface components, in form of multiple pages, and panel page control means 13 for controlling to switch each page on the operation panel.**

**(0015)**

**(Operation)**

**In the interactive processing system of the present invention, multiple interface components for executing the user interface function on the display screen of the display device are positioned in the operation screen panel of one window. In this interactive processing system, the operation control panel in which to position the interface components is controlled as multiple pages by the page control means 10. Each page of multiple pages on the operation screen panel controlled by the page control means 10 is controlled to be switched by the panel page control means 13.**

**(0016)**

**When multiple interface components for presenting the graphic user interface function are positioned in the operation panel on the display screen in this interactive processing system, the operation panel is controlled in form of multiple pages. More specifically, a concept of pages is introduced into the operation panel, and to turn each page, multiple pages of operation screen panel are switched. By so doing, even if the operation panel is reduced in size, many interface components can be positioned in it since the operation panel contains multiple pages.**

**(0017)**

**When an application program containing a graphic user interface with**



multiple pages is executed, the window on the operation screen panel needs not be enlarged, so it does not occupy most part of the display screen of the display device. Also, only one window is sufficient for the graphic user interface operation screen, solving the problem that multiple windows of the operation panel need to be used on the display screen of the display device for one application program.

(0018)

By this, even if multiple interface components are used for one application program, only one window is used for one application program on the operation screen of the graphic user interface. Accordingly, when multiple interface components are positioned on the operation screen panel for the user interface function, multiple windows need not be installed to control them, and its program size can be made small. Therefore, only a small memory capacity is sufficient for operating one application program, and the load for handle the application program will not be high.

(0019)

(Embodiment)

The embodiment of the present invention is explained below with reference to the drawings. Fig. 1 shows a block diagram of the key components of the interactive processing system as an embodiment example of the present invention. In the figure, 1 indicates a library for the graphic user interface components, 11 an

**application program, 12 the interface control unit, 13 the panel page control unit, 14 the operating system, 15 the hardware system device, 16 the display device such as a CRT display device, 17 the keyboard for character input, 18 the mouse as a pointing device, 19 the graphic user interface creation editor.**

**(0020)**

**The hardware system device is constructed by a microprocessor, main memory, and hardware such as I/O controller, and functions as a device for basic data processing. To this hardware system device 15, the input/output devices, such as the display device 16, keyboard 17, and mouse 18, are connected, and the entire hardware device including the hardware control is structured. The operating system 14 is composed of system control program for the basic input/output process, memory process, and for the system control process, and presents a system environment in which to operate each application program, while controlling the entire system of the hardware device.**

**(0021)**

**The panel page control unit 13 is installed as a subsystem for controlling the pages of the operation screen panel of the interface function when the user interface control unit 12 controls the interface for the application program unit 11. The user interface control unit 12 controls each interface component positioned by the panel page control unit 13 on the operation screen panel containing multiple pages, and**

**executes the user interface function when the application program unit 11 operates.**

**In this system structure, the application program unit 11 executes the application program.**

**(0022)**

**In this example, the panel page control unit 13 is installed as a subsystem of the user interface control 12, but this panel page control unit 13 controls to switch each page of the operation screen panel when the operation screen panel of the user interface contains multiple pages. As to operation screen panel containing multiple pages, the page data on the operation screen panel corresponding to each page is controlled in the graphic user interface component library 10.**

**(0023)**

**This page data (the operation screen panel data for each page unit) is newly created by the graphic user interface creation editor 19, edited, and registered in the graphic user interface component library 10 to be controlled. The graphic user interface creation editor 19 presents an editing function for creating a comprehensive graphic user interface including the creation of an interface component, and creates the data for the graphic user interface by page unit.**

**(0024)**

**Therefore, by means of panel page control unit 13, graphic user interface component library 10, and of graphic user interface creation editor 19, the graphic**

**interface creation support device is created to support the graphic user interface having a pagination function.**

**(0025)**

**When the application program is executed in the application program unit 11, the panel page control unit 13 reads the page data designated by the user, the necessary graphic user interface component is displayed on the screen (application window) of the display device 16 by means of the operating system 4. Once the user acts to respond to this operation, this user's action is communicated to the application program unit 11 via keyboard 11, mouse 18, operating system 14, panel page control unit 13 and user interface control unit 12. At this time, it is not necessary to detect which page of the operation panel is displayed in the application program unit 11. Because the process required for switching the pages of the operation panel is performed by the panel page control unit 13 and the user interface control unit 12.**

**(0026)**

**Fig. 2 illustrates the first page when the operation panel page data of the graphic user interface was created for the interactive processing system in the embodiment example. Fig. 3 illustrates likewise the second page of the page data of the operation panel. In Fig. 2 and Fig. 3, 20 indicates the display screen of the display device, 21 the editing window of the graphic user interface creation editor,**

22 the editing command area, and 23 the operation panel in the first page, 24 the current page indication area in the operation panel, 25 the components palette, 26 the previous page button, 27 the rear page button, 28 the save button, 29 the mouse cursor, 30 the interface component button A, 31 the interface component button B, 32 the button C for the interface components, 33 the button D for the interface components, and 34 the operation panel in the second page.

(0027)

When the graphic interface is created, a mouse is operated to move the mouse cursor 29, and each component for structuring the desired graphic interface is selected from the palette 25 to paste it to a specific position of the operation panel in the editor window 21. More specifically, the constituent elements, such as drawings, text frames, buttons for the interface, are shown in component palette 25 as the components constituting the graphic user interface. By operating a mouse to move the mouse cursor, the necessary component is selected from the component palette 25. The mouse is further operated to position and paste the selected component on the operation screen panel 23 where the graphic interface is created. In this embodiment example, the button 30 and button 31 for the interface components, frame 32, scroll bar 33, and the text frame are pasted on the operation screen panel 23.

(0028)

On the lower part of the operation panel 23, the current page indication area 24 is made, and in this area 24, the page number of the operation screen panel 23 that is being edited at present is indicated. This indication "page 1 of 2" means that the operation screen panel being created for the graphic user interface in the application program contains 2 pages in total and its first page is being edited at present. To edit each page of the operation screen panel, deletion, addition and insertion can be made page by page by use of the page editing command in the editing command area 22 (not shown in the drawings), so the pages of the operation screen panel, which is the base for pasting the interface components, can be edited as needed.

(0029)

Thus, the editing of the operation screen panel 29 of the first page for the graphic user interface is completed. Then, the mouse cursor 29 is operated to select the rear page button 27 in the editing command area 22, in other words, by positioning the mouse cursor 29 on the following page button and clicking the button of the mouse, the aforementioned panel page control unit controls to switch the page, as shown in Fig. 4. As a result, the content of the editing window 21 is switched to the operation screen panel 34 in the second page, and the operation screen panel 34 of the second page is edited in the same manner as that in the first page.

**(0030)**

As shown in Fig. 3, if the operation screen panel of the first page needs to be resumed for editing when the operation screen panel of the second page is being edited in the editing widow 21, the mouse cursor 29 can be operated to select the previous page button 26 in the editing command area 22. Then, the editing window 21 displays the operation screen panel of the first page, to allow the editing.

**(0031)**

In the operation screen panel 34 in the second page, the button 35 and button 36 of the interface components are positioned on the operation screen panel 34. After each page of the operation screen panel is edited until all the pages have been edited, the save button 28 in the editing command area is pushed. By this, the completion of all editing operations for creating the graphic user interface is indicated. By so doing, the edited data on the operation screen panels of all the pages are saved in the file, and registered in the graphic user interface component library 10 as the page data file.

**(0032)**

Fig. 4 shows the first illustration of the operation example using the operation screen panel having multiple pages for the graphic user interface. Fig. 5 shows likewise the second illustration of the operation example using the operation screen panel having multiple pages for the graphic user interface. In Fig. 4 and Fig. 5, 40

indicates the display screen of the display device, 41 the application window, 42 the page turning command area on the operation screen panel, 43 the operation screen panel of the first page, 44 the current page display area of the operation screen panel, 45 the button for the previous page, 46 the button for the following page, 47 the mouse cursor, 48 the button A for the interface components, 49 the button B for the interface component, 50 the operation screen panel of the second page, and 51 the button C for the interface components, and 52 the button D for the interface component.

(0033)

As shown in Fig. 4, once the application program having the graphic user interface with multiple pages is activated, the application window 41 is displayed on the display screen 40. Once the application window 41 is opened, the operation screen panel 43 of the first page is displayed, so the user interface function can be controlled by the button 48 and button 49 of the interface components positioned on the operation screen panel 49 of the first page.

(0034)

In said application program, if the user wants to begin other interface operation after having completed the interface operation in the operation screen panel 43 of the first page, the user clicks the button 46 for the following page in the page turning command area 42 on the operation screen panel by operating the



mouse cursor. By so doing, this action is detected, and the display of the application window 41 is switched to that of the operation screen panel 50 of the second page by the control of said panel page control unit 13. Then, the user interface function can be controlled by the interface components on the operation screen panel of the second page.

(0035)

In the application window 41, the current page display area 44 is installed on the upper part of the operation screen panel, and in this current page display area 44, the current page number of the operation screen panel currently displayed is indicated. For example "page 2 of 2" indicates that the operation screen panel displayed on the application window has 2 pages in total, and the second page is currently being displayed.

(0036)

As explained above, in the interactive processing system as the embodiment example of the present invention, the operation screen panel, which is used for positioning multiple interface components of the graphic user interface function on the display screen in the application program, has multiple pages, each having an operation screen panel, which can be switched properly. Since multiple operation screen panels can be switched within one application window, the graphic interface of the interactive processing system has an excellent space efficiency and is easily

**understood.**

**(0037)**

**The following passage explains other examples or variant forms of example of the constituent elements in the interactive processing system as the embodiment example of the present invention.**

**(0038)**

**(1) In the aforementioned embodiment example, only the “previous page button” and the “following page button” are installed as the buttons of the interface for the page turning control of each page with the operation screen panel. But, it is also possible to switch the display of the page to that of the desired page by inputting the page number from the keyboard.**

**(0038)**

**(2) In the above embodiment example, the button for turning the pages is installed in the command area other than the operation screen panel of each page, but this button of the interface for page turning control may be incorporated into the operation screen panel of each page as the button of the interface components. In such a case, the button of the interface for page turning control needs to be incorporated into each page of the operation screen panel. By so doing, the page turning of the operation screen panel is not limited to the “previous page” and “the following page,” but ----- [T. Note: One line is missing.]. So the page turning button**

can be installed on each page of the operation screen panel.

(0039)

(3) In the above embodiment example, the pages of the operation screen panel were switched by the user's operation of the mouse, and the display of each page of the operation screen panel was actively commanded. But, it is also possible that according to the internal data being processed by the application program, an optimal page for the processing can be displayed by automatic switching. By this automatic switching, the user's task of turning the pages of the operation screen panel can be omitted when the user operates the interface.

(0040)

(4) In the above embodiment example, the pages are switched by the user's clicking on the "previous page" and "the following page," but it is also possible that as the page turning controlling interface, the interface component such as a scroll bar may be used to continuously turn the pages of the operation screen panel. Or the pages may be displayed by providing the scroll bar with a jump function assigned with each page to immediately switch to the desired page.

(0041)

(5) In the above embodiment example, only one operation screen panel was displayed on the application window, but it is also possible that multiple pages are

simultaneously displayed by properly dividing one operation screen panel into multiple operation screen panels by user's command. By so doing, multiple pages do not need to be turned page by page but can be simultaneously operated on the display screen, which is efficient in operation.

(0042)

(Advantage)

As explained above, in the interactive processing system of the present invention, since the operation panel of the graphic user interface contains multiple pages, the interface components can be positioned within a small window with space efficiency even when many interface components are used in the application program. Therefore, when many interface components are positioned on the operation screen panel of the user interface function, multiple windows need not be installed, as they were in the prior art. In addition, the number of programs for controlling the interface can be minimized, and a small memory capacity is sufficient for operating the application program, which in turn reduces the load for handling the application program.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

Fig. 1 shows a block diagram of the key components of the interactive processing system as the embodiment example of the present invention. Fig. 2

illustrates the first page when the page data of operation screen panel of the graphic user interface is created in the interactive processing system as the embodiment example. Fig. 3 illustrates the second page likewise. Fig. 4 shows the first illustration of the operation example using the operation screen panel having multiple pages for the graphic user interface. Fig. 5 likewise shows the second illustration of the operation example using the operation screen panel having multiple pages for the graphic user interface.

10. Graphic user interface component library

11. Application program unit

12. Interface control unit

13. Panel page control unit

14. Operating systems

15. Hardware system device

16. Display device

17. Keyboard

18. Mouse

19. Graphic user interface creation editor

20. Display screen of the display device

21. Editing window

22. Editing command area

- 23. Operation screen panel of the first page**
- 24. Current page display area**
- 25. Component palette**
- 26. Previous page button**
- 27. Following page button**
- 28. Save button**
- 29. Mouse cursor**
- 30. Button A for the interface component**
- 31. Button B for interface component**
- 32. Button C for interface component**
- 33. Button D for interface component**
- 34. Operation screen panel of the second page**
- 40. Display panel of display device**
- 41. Application window**
- 42. Page turning command area**
- 43. Operation screen panel of the first page**
- 44. Current page display area**
- 45. Button for the previous page**
- 46. Button for the following page**
- 47. Mouse cursor**

- 48. Button A of interface component**
- 49. Button B of interface component**
- 50. Operation screen panel of the second page**
- 51. Button C of interface component**
- 52. Button D of interface component**